Research & Reviews: Journal of Pharmaceutics and Nanotechnology e-ISSN: 2347-7857
P-ISSN: 2347-7849

An Elaborative Study of prodrug

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Opinion Article

Received: 28-Nov-2022, Manuscript No. JPN-23-84595; **Editor assigned:** 01-Dec-2022, Pre QC No. JPN-23-84595 (PQ); **Reviewed:** 14-Dec-2022, QC No. JPN-23-84595; **Revised:** 21-Dec-2022, Manuscript No. JPN-22-84595 (A); **Published:**30-Dec-2022 **DOI:**10.4172/23477857.10.1.001.

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DESCRIPTION

A prodrug is a chemical structure that acts as a precursor to a drug. A prodrug is a molecular structure that contains an active molecular entity. The prodrug itself is frequently physiologically inactive although it may also be biologically active. Following metabolic or physicochemical processes such as hydrolysis the molecular entity is liberated from the prodrug. Prodrugs are typically designed to increase bioavailability the conversion process might occur intracellularly or extracellularly.

It is important to note that drug design and pharmacokinetics might be perplexing in tracing origins. This is done on purpose with prodrugs which account for a considerable portion of all marketed drugs. In 2009, over 15% of the top 100 small-molecule medications were prodrugs and approximately 10% of all approved small-molecule drugs may be prodrugs. The active metabolite is released from the normally inactive promoiety among the promoiety prodrugs.

This may be significant for evaluating environmental effect. For instance, two or more different medications must be taken into consideration as contributory sources in the models used to determine expected environmental concentrations for this prodrug Active Pharmaceutical Ingredient (APIs). The term prodrug refers to a chemically altered inactive substance that when administered releases the active parent drug to cause the body to produce its therapeutic effects. Prodrug strategies have been developed more and more over the past few decades to get around undesirable drug physicochemical features.

Prodrugs typically contain a promoiety that is eliminated through enzymatic or chemical processes; however, some prodrugs release their active medications only after undergoing molecular change through processes like oxidation or reduction. In some circumstances two active medications can be joined to form a single molecule known as a codrug. Each codrug serves as a bridge for the others drug reactions. The prodrug must be pharmacologically inactive, quickly transformed into its active drug and have a non-toxic moiety. In his book Selective Toxicity Albert

coined the phrase "prodrug" for the first time about 55 years ago. The first prodrug's nature was later identified; it was not clearly meant to be a prodrug. Acetanilide and phenacetin were earlier instances of chemicals that meet the traditional criteria for prodrugs and display their actions after being digested by the body. The antipyretic drug acetanilide was first used in medicine in 1886. Similar to how phenacetin makes paracetamol by O-dealkylation, it passes through metabolism to become paracetamol.

The antipyretic drug Aspirin was created by chemist Felix Hoffman at Bayar-Company in the late nineteenth century. It was first used in clinical practice in 1899 and can be thought of as a less corrosive prodrug form of salicylic acid to reduce the gastric irritation and ulcerogenicity linked to salicylic acid.

Prodrug design is an effective approach for solving these issues. Poorly permeable medicines can be made more lipophilic by being attached to a lipophilic linker, allowing for oral, ocular or local drug delivery. By attaching the drug to polar or ionizable groups, prodrugs can also be employed to boost the medication's solubility in water.

In addition, prodrugs use has succeeded to overcome site selectivity problems which can be achieved by targeting a specific enzyme or receptor such as targeting an enzyme that is over expressed in tumor cells. Further, monoclonal antibodies have been used as ligands to transport prodrugs to tumor cells. They are designed as drug-antibody conjugate or antibody enzyme conjugate targeting membrane transporters is utilized in order to increase absorption such as in the case of valacyclovir prodrug.